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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/555,852	11/07/2005	Kyung Sun Kang	4240-130	4588

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EXAMINER	
BERTOGLIO, VALARIE E	

ART UNIT	PAPER NUMBER
1632	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/555,852	KANG, KYUNG SUN	
	Examiner	Art Unit	
	Valarie Bertoglio	1632	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) *12-16* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 November 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's election with traverse of Group I, claims 1-11 and 16 in the reply filed on 01/30/2008 is acknowledged. The traversal is on the ground(s) that the stem cells of Group I are required in the methods of Groups II and III. Applicant has requested rejoinder upon finding allowable subject matter in Group I.

This is not found persuasive because no claim has been found allowable.

The requirement is still deemed proper and is therefore made FINAL.

Claims 1-16 are pending. Claims 12-15 are withdrawn. Claims 1-11 and 16 are under examination in the instant office action.

Specification

The disclosure is objected to because of the following informalities: It appears the term "stel" at line 4 of page 4 should read "stem". The term "endoderaml" at line 2 of page 4 should read "endodermal".

Appropriate correction is required.

Double Patenting

Claims 3,7,8 and 10 are objected to under 37 CFR 1.75 as being a substantial duplicate of claim 1. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). The recited intended use in claims 7 and 8 fails to alter the scope of claim 1. Recitation of both a positive and negative condition in claim 3 fails to alter the scope of claim 1. The recited intended use in claim 10 fails to alter the scope of claim 3, and thus, claim 1.

Claim 9 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 2. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). The recited intended use in claims 9 fails to alter the scope of claim 2.

Claim 11 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 3. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). The recited intended use in claims 11 fails to alter the scope of claim 3.

Claim Rejections - 35 USC § 112-1st paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. 37 CFR 1.118 (a) states that "No amendment shall introduce new matter into the disclosure of an application after the filing date of the application".

Claims 1-11 are drawn to adult stem cells (or methods of producing them) obtained by culturing cord blood showing numerous recited immunological responses and having the ability to differentiate into

mesodermal, ectodermal and endodermal cells. Literal support for the full breadth of these recitations is not found in the specification. The claims encompass a homogeneous population of cells, or even a heterogeneous population of cells, wherein all cells exhibit all of the recited requirements. The claim does not require isolation of any particular cells that have each recited characteristic nor does the specification teach such. The specification also fails to teach the presence of a cell in cord blood having all of the recited characteristics. For example, the specification teaches at page 14, lines 1-8, that only 63.8% of cells were CD45+ whole 96.54% were SH2 positive. Thus, not all SH2 positive cells will be CD45+, if any are.

To the extent that the claimed compositions and/or methods are not described in the instant disclosure, claims 1-11 are also rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention, since a disclosure cannot teach one to make or use something that has not been described.

MPEP 2163.06 notes "If new matter is added to the claims, the examiner should reject the claims under 35 U.S.C. 112, first paragraph - written description requirement. In re Rasmussen, 650 F.2d 1212, 211 USPQ 323 (CCPA 1981)." MPEP 2163.02 teaches that "Whenever the issue arises, the fundamental factual inquiry is whether a claim defines an invention that is clearly conveyed to those skilled in the art at the time the application was filed. If a claim is amended to include subject matter, limitations, or terminology not present in the application as filed, involving a departure from, addition to, or deletion from the disclosure of the application as filed, the examiner should conclude that the claimed subject matter is not described in that application. MPEP 2163.06 further notes "When an amendment is filed in reply to an objection or rejection based on 35 U.S.C. 112, first paragraph, a study of the entire application is often necessary to determine whether or not "new matter" is involved. Applicant should therefore specifically point out the support for any amendments made to the disclosure" (emphasis added).

Claim Rejections - 35 USC § 112-2nd paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 5 are unclear because it is drawn to an "adult stem cell" that has the ability to "differentiate into mesodermal, endodermal and ectodermal cells". However, the specification defines "adult stem cells" as being multipotent stem cells (page 4, paragraph 2). Cells which can differentiate into mesodermal, endodermal and ectodermal cells are considered to be pluripotent (page 4, paragraph 1). Thus, it is not clear if claim 1 is intended to encompass pluripotent cells only or to encompass a mixture of multipotent adult stem cells that cumulatively can differentiate into mesodermal, endodermal and ectodermal cells but no one cell has the ability to differentiate into all 3 germ layers.

The specification refers to the cells of the invention as 'multipotent' (page 9, lines 12,18 and 23; page 11, lines 11,17 and 24; page 12, lines 19,24 and 30, for example). The specification states that the inventive multipotent cells are considered as stem cells which are in differentiation from hematopoietic cells into monocytes. Thus, it would appear that the cells of the invention do not have the ability to differentiate into mesodermal, ectodermal and endodermal lineages but, rather, are lineage restricted. For the purpose of examination, claim 1 will be interpreted as being drawn to heterogeneous population of multipotent stem cells. Claims 2-4 and 7-11 depend from claim 1. Claim 6 depends from claim 5.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for

patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4 and 7-11 are rejected under 35 U.S.C. 102(a) and (e) as being anticipated by Rai (US 2004/0203142, published 10/14/2004, filed 04/14/2003).

Claims are drawn to adult stem cells, a population of cells, showing specific immunological characteristics, exhibiting growth adhered to plastics and round or spindle shaped morphology and having the ability to differentiate into mesoderm, endoderm and ectodermal cells. The claim does not require any single cell exhibit each claimed characteristic but that the culture, as a whole, exhibit the claimed characteristics. Thus, not all cells of the culture are required by the claims to express CD24,CD29, CD31, CD33, CD45, and CD49B. Furthermore, the specification teaches that 90% of cells were CD34. Thus, the instant specification fails to support that ALL cells of the claimed population lack ALL expression of the recited antigens. Thus, the claims are interpreted, in light of the specification, as being a population of cells wherein some portion of the cells exhibit the recited limitations in some combination. Claims 7-11 are drawn to therapeutic agents comprising the cells of claims 1-4 and each recite a different intended use, which is not given patentable weight as it fails to differentiate each claimed product.

Rai taught culture of human cord blood cells using umbilical cord serum (human serum) (paragraph [0016]). Mononuclear cells were isolated from cord blood (paragraph [0037]) and plated in medium containing FBS or CBS. Rai taught conventional culture media comprising bovine serum are associated with shortcomings and risks inherent in use of serum from a nonhuman source. Animal serum such as FBS can be infected with pathogens (Paragraphs [0012] and [0013]. Rai taught flow cytometric analysis of cord blood cells cultured in FBS vs. CBS (cord blood serum). Greater than 90% of the cells exhibit a CD133-/CD45+ phenotype. The cell count and antigenic phenotype of adherent cells were determined to be similar for cells cultured in FBS and CBS indicating that CBS supports growth of non-adherent cells with equal efficacy as compared to FBS (paragraph [0039] and Table 2). Rai additionally

taught, by example, differentiation of the cells by use of neural differentiation medium, which would result in cells of the neural lineage rather than favoring all three germ lineages as claimed. However, such differentiation medium is not required by the teachings (paragraph [0032]). Rai taught that the cells, prior to directed neural differentiation, were CD133-/CD34-/CD45+ as claimed. Expression of other claimed markers (e.g. claim 2 and 3) are inherent in the population as the cells are cultured using the same methods as taught by the instant specification. Thus, the cells of Rai, adherent, mononuclear hUCB cells cultured with human serum, are the same cells as claimed and inherently would have the claimed characteristics.

It is noted that, "Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. See MPEP 2112.01 and *In re Best*, 195 USPQ 430, 433 (CCPA 1997). The office does not have the facilities for examining and comparing applicant's product with the product of the prior art in order to establish that the product of the prior art does not possess the same material, structural and functional characteristics of the claimed product. In the absence of evidence to the contrary, the burden is upon the applicant to prove that the claimed products are functionally different than those taught by the prior art and to establish patentable differences. See *Ex parte Phillips*, 28 USPQ 1302, 1303 (BPAI 1993), *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977) and *Ex parte Gray*, 10 USPQ2d 1922, 1923 (BPAI 1989).

Claims 1-4 and 7-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Rosada *et al.* (2003, **Calcif Tissue Int**, 72:135-142) as evidenced by Rai (US 2004/0203142).

Claims are drawn to adult stem cells, a population of cells, showing specific immunological characteristics, exhibiting growth adhered to plastics and round or spindle shaped morphology and having the ability to differentiate into mesoderm, endoderm and ectodermal cells. The claim does not require any single cell exhibit each claimed characteristic but that the culture, as a whole, exhibit the claimed

characteristics. Thus, not all cells of the culture are required by the claims to express CD24,CD29, CD31, CD33, CD45, and CD49B. Furthermore, the specification teaches that 90% of cells were CD34. Thus, the instant specification fails to support that ALL cells of the claimed population lack ALL expression of the recited antigens. Thus, the claims are interpreted, in light of the specification, as being a population of cells wherein some portion of the cells exhibit the recited limitations in some combination. Claims 7-11 are drawn to therapeutic agents comprising the cells of claims 1-4 and each recite a different intended use, which is not given patentable weight as it fails to differentiate each claimed product.

Rosada taught isolating mononuclear cells from hUCB and culturing adherent cells in a medium containing 10% FCS (page 135, col.2, paragraph 4).The cells appeared fibroblast-like in form. Rosada further characterized what was termed hUC-stromal cells (hUC-Sc). Rosada did not specifically teach the claimed cell surface markers or demonstrate the presence of cells that differentiate into mesoderm, endoderm and ectoderm. However, Rosada taught adherent cells from hUCB cultured in 10% FCS. As discussed by Rai (US 2004/0203142), culture in FCS as opposed to human serum does not alter the cells in the population. Rai states the "This shows that cord blood serum supports growth of nonadherent cells in these cultures with equal efficacy as compared to fetal bovine serum" (see Table 2, paragraph 0039). Thus, the cells of Rosada, adherent, mononuclear hUCB cells, are the same cells as claimed and inherently would have the claimed characteristics.

It is noted that, "Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. See MPEP 2112.01 and *In re Best*, 195 USPQ 430, 433 (CCPA 1997). The office does not have the facilities for examining and comparing applicant's product with the product of the prior art in order to establish that the product of the prior art does not possess the same material, structural and functional characteristics of the claimed product. In the absence of evidence to the contrary, the burden is upon the applicant to prove that the claimed products are functionally different than those taught by the prior art and to establish patentable differences. See *Ex parte Phillips*, 28 USPQ 1302, 1303 (BPAI 1993), *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977) and *Ex parte Gray*, 10 USPQ2d 1922, 1923 (BPAI 1989).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rai (US 2004/0203142, published 10/14/2004, filed 04/14/2003) in view of Garbuzova-Davis [2003, **Jour Hematotherapy and Stem Cell Research**, 12:255-270) *or* Erices (2000, **British Journal of Hematology**, 109:235-242) *or* Rosada (2003, **Calcif Tissue Int**, 72:135-142).

Claim 5 is drawn to method for producing adult stem cells comprising steps of culturing umbilical cord-derived blood in a medium containing 5-20% human serum and recovering the stem cells. The characteristics of the cells recited in the preamble are given no patentable weight.

Rai taught culture of cord blood cells using umbilical cord serum (human serum) (paragraph [0016]). Rai taught conventional culture media comprising bovine serum are associated with shortcomings and risks inherent in use of serum from a nonhuman source. Animal serum such as FBS can be infected with pathogens (Paragraphs [0012] and [0013]). The cell count and antigenic phenotype of adherent cells were determined to be similar for cells cultured in FBS and CBS indicating that CBS supports growth of non-adherent cells with equal efficacy as compared to FBS (paragraph [0039] and Table 2). Rai taught that the cells can be used for allologous or autologous transplant. Rai did not teach use of 5-20% serum as the amount of serum used was not set forth.

However, Rai did state that FBS and CBS had similar function and effect and did not teach use of differing amounts of CBS compared to FBS. It was standard in the art at the time of filing to use serum at concentrations of 5-20% as claimed and thus, it would have been obvious to use the same amount of CBS in the method of Rai as one would normally use in the art for FBS. For example, Garbuzova-Davis taught use of 10% FBS (page 257, col. 2, paragraph 2); Erices et al taught use of 20% FBS (page 235, col.2, last line); Rosada taught use of 10% FCS (page 135, col.2, paragraph 4).

It would have been obvious at the time of filing to combine the teachings of Rai substituting CBS for FBS with the teachings of Garbuzova-Davis or Erices or Rosada using 10 or 20% FBS to arrive at the claimed method of using CBS in amount of 5-20%. One would have been motivated to use 5-20% CBS as CBS is a similar composition (animal serum) to be used for the same purpose as FBS was previously used in the art. Thus, as Rai taught CBS and FBS to be essentially equivalent elements, one would have been motivated to use a similar range of concentrations of CBS as was known and accepted for FBS.

It is noted that KSR forecloses the argument that a specific teaching, suggestion, or motivation is required to support a finding of obviousness. See the recent Board decision *Ex parte Smith*, --USPQ2d--, slip op. at 20, (Bd. Pat. App. & Interf. June 25, 2007) (citing KSR, 82 USPQ2d at 1396) (available at <http://www.uspto.gov/web/offices/dcom/bpai/prec/fd071925.pdf>).

Conclusion

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Valarie Bertoglio whose telephone number is (571) 272-0725. The examiner can normally be reached on Mon-Thurs 5:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Paras can be reached on (571) 272-4517. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Valarie Bertoglio, Ph.D./
Primary Examiner
Art Unit 1632